

CLAIMS

We claim:

- [c1] 1. A method in a computer system for loading a version of a hierarchical document, comprising:
- creating a snapshot of the hierarchical document;
 - storing a modification made to the hierarchical document;
 - receiving a request for a version of the hierarchical document;
 - locating a snapshot near the requested version of the hierarchical document;
 - loading the located snapshot; and
 - using the stored modification to re-create the requested version.
- [c2] 2. The method of claim 1 wherein a first snapshot is closer to the requested version than a second snapshot when the first snapshot was created closer in time to a requested time than the time at which the second snapshot was created.
- [c3] 3. The method of claim 1 wherein a first snapshot is closer to the requested version than a second snapshot when fewer modifications are stored between the first snapshot and the requested version than between the second snapshot and the requested version.
- [c4] 4. The method of claim 1 wherein the request is received at a server computing device from a client computing device.
- [c5] 5. The method of claim 1 wherein the request is generated by a client computing device in response to a message from a server computing device to undo changes the client computing device applied to a local copy of the hierarchical document.

- [c6] 6. The method of claim 1 wherein the method is performed by a client computing device.
- [c7] 7. The method of claim 1 wherein the method is performed by a server computing device.
- [c8] 8. A computer-readable medium for creating a version of a hierarchical document, the hierarchical document having a node, comprising:
 a snapshot of the hierarchical document, wherein the snapshot includes the node and any attributes relating to the node; and
 an indication of a mutation applied to the node, wherein the indication includes a time the mutation was applied.
- [c9] 9. The computer-readable medium of claim 8 wherein the indication of a mutation includes a user requesting the mutation.
- [c10] 10. A system for loading a version of a hierarchical document, the hierarchical document having a node, comprising:
 a component that stores a snapshot of the hierarchical document, the snapshot including the node;
 a component that stores a mutation applied to the node; and
 a component that loads a version of the hierarchical document.
- [c11] 11. The system of claim 10 wherein the loading includes loading a snapshot near an indicated version and applying stored mutations.
- [c12] 12. The system of claim 11 wherein the loaded snapshot is nearer the indicated version than another snapshot.

- [c13] 13. A system for loading a version of a hierarchical document, comprising:
- a component that creates a snapshot of the hierarchical document;
 - a component that stores a modification made to the hierarchical document;
 - a component that receives a request for a version of the hierarchical document;
 - a component that locates a snapshot near the requested version of the hierarchical document;
 - a component that loads the located snapshot; and
 - a component that uses the stored modification to re-create the requested version.
- [c14] 14. The system of claim 13 wherein a first snapshot is closer to the requested version than a second snapshot when the first snapshot was created closer in time to a requested time than the time at which the second snapshot was created.
- [c15] 15. The system of claim 13 wherein a first snapshot is closer to the requested version than a second snapshot when fewer modifications are stored between the first snapshot and the requested version than between the second snapshot and the requested version.
- [c16] 16. The system of claim 13 wherein the request is received at a server computing device from a client computing device.
- [c17] 17. The system of claim 13 wherein the request is generated by a client computing device in response to a message from a server computing device to undo changes the client computing device applied to a local copy of the hierarchical document.

[c18] 18. The system of claim 13 wherein the method is performed by a client computing device.

[c19] 19. The system of claim 13 wherein the method is performed by a server computing device.